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ABSTRACT

This correspondence presents additional information on the July report "Math and Science Education: Comprehensive Information about Federally Funded Materials Not Available by the United States General Accounting Office." It provides information on each of the 61 materials, including the topics covered and a summary of their instructional goals. A table summarizes the duration of the instruction for which the materials were designed. (ASK)

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United States General Accounting Office
Washington, DC 20548

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October 12, 2000

The Honorable F. James Sensenbrenner
Chairman
The Honorable Vernon Ehlers
Vice-Chairman
The Honorable Ralph M. Hall
Ranking Minority Member
Committee on Science
House of Representatives

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The Honorable Eddie Bernice Johnson
Ranking Minority Member
Subcommittee on Basic Research
Committee on Science
House of Representatives

Subject: Federally Funded Math and Science Materials

As a follow-up to our July report Math and Science Education: Comprehensive Information About Federally Funded Materials Not Available (GAO/HEHS-00-110, July 12, 2000), you asked us to provide additional information on each of the 61 materials identified in our report.[1] Specifically, you asked us to describe (1) the topic and/or scope of these materials, and (2) the materials' designed duration of instruction—that is, whether the materials are designed to be used over the course of a partial academic school year, a single academic school year, or multiple academic school years.

The enclosure to this letter provides information about each of the materials including the topics covered and a summary of their instructional goals. Table 1 summarizes the duration of the instruction for which the materials were designed.

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[1] Materials refer to comprehensive materials sets that contain all of the components a teacher would need to teach and a student would need to learn one or more mathematics and/or science concepts.

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Table 1: Federally Funded Math and Science Materials

Designed duration of instruction[a]	Number of materials
Partial academic school year[b]	40
Single academic school year	7
Multiple academic school years	11
Other instructional duration[c]	2
Information not available	1
Total number of materials	61

[a]Teachers may also use the materials for shorter or longer periods of instruction.

[b]The design of these materials allows them to be used for instructional periods varying from a single 50-minute session up to at least half of the academic year.

[c]Materials that fall within this category may be used as partial, single, or multiple academic school year materials.

Source: GAO review of federally funded math and science materials.

To obtain the information for this correspondence, we synthesized responses to a survey of the eight agencies that supported the development of these materials and conducted a search of Internet sites that disseminate information about math and science materials for kindergarten through 12th grade. We provided officials at each of the eight agencies an opportunity to review and comment on our description of their materials. Some program officials provided technical comments on the information, which we incorporated as appropriate. We performed our work between May 2000 and September 2000 in accordance with generally accepted government auditing standards.

If you have any questions about this correspondence, please call me at (202) 512-7215, or Joan Mahagan at (617) 565-7532. Arthur T. Merriam Jr., Joseph G. Evans, and William H. Ewell were also major contributors.

Marnie S. Shaul

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Director
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Enclosure

Math and Science Materials Resulting from Federally Funded Projects That Became Available During Fiscal Year 1999, by Agency

Material name	Topic(s) covered	Targeted grade level	Duration (in academic years)[a]	Description
Department of Education				
Algebra	Algebra	5-8	Partial[b]	This material is designed as an 8-week course to teach urban middle school educators better techniques for teaching algebra. The material also provides resources for use by classroom teachers.
Calculus Enhancement	Calculus	11-12	Partial	The goal of this material is to teach high school students calculus and advanced-placement calculus using distance learning technologies. The material includes a CD-ROM, digitized video, and an interactive website.
College of Central Wyoming—Mountain Plains Distance Learning Partnership	General studies	K-12 and adult	Partial, single, or multiple	This material is designed as a virtual campus and covers large rural areas in parts of Wyoming, Colorado, Utah, and Montana. The material is designed to use live, interactive, full motion, and two-way audio and visual capabilities and includes a variety of modules and complete courses on a range of topics including math and science education.
Community for Learning	General studies	K-12	Partial	The goal of this material is to improve the capacity of schools to achieve the educational success of increasingly diverse student populations. This material is designed as a research-based comprehensive school reform model that employs adaptive learning environments, cooperative learning, and school-to-family strategies along with intensive classroom management training.

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Connections Curriculum Units	General studies	5-12	Partial	The goal of this material is to (1) demonstrate the use of technology in teaching and learning, and (2) enhance teacher professional development and student learning through the use of technology. The materials include components of math, science, social studies, language arts, foreign language, and other school subject areas. Teacher units are currently available via the World Wide Web.
Envirotackle Box	Environmental science	6-8	Partial	The goal of this material is to teach middle school students and teachers about the environment. The material includes five 20-minute tele-lessons, teachers' guides, and information available on a Web site.
GeogWeb Curriculum Units	General studies	K-12	Information not available	The goal of this material is to develop a World Wide Web site for learning about communities. The material is designed to be used by students, teachers, and the community at large.
Head Start on Science	Natural science	K-2	Multiple	The goal of this material is to provide a program of professional development and technical assistance for preschool educators that explores the scientific approach to learning. The material is designed to strengthen children's communication skills and to foster an early interest in science literacy. The material also provides resources for use by classroom teachers.
Journeys to Alaska	Science, national parks	6-8	Partial	The goal of this material is to teach middle school students a range of science topics, including geology and weather, through the use of electronic field trips to national parks in Alaska. Trips are available live via satellite downlinks, on videotape, and through a Web site.
K-12 Curriculum Database with Correlated Resources	General math, science, and language studies	K-12	Single	The goal for the use of these materials is to provide instructional tools and technology training for teachers, students, and parents. The tools include an instructional Web site, a core curriculum database, and lesson plans in math, science, and language arts.

KID SCIENCE	Oceanography, electricity, environmental and physical science	5-6	Single	This material is designed to be a live, interactive program for the delivery of learning materials to elementary schools. The goal of the material is to teach science concepts and methodologies relating to oceanography, electricity, environmental issues, and physical science through a variety of hands-on activities, on-line resources, and projects integrated with the televised programs.
Math Wings	General math and problem solving	K-5	Multiple	The goal of this comprehensive math curriculum is to teach students the conceptual development and practical application of math skills including problem solving, calculator use, alternative assessments, writing, and connections to literature and other disciplines.
Nature Scene	Natural science	5-8	Partial	This material is designed to teach science using 80 Nature Scene shows. The shows are based on key scientific terms and concepts that are identified along four major science education themes. The material includes lesson guides with teaching suggestions for elementary, middle, secondary, and parent audiences.
Pacific Algebra Network	Algebra	8-10	Single	The goal of this material is to support the professional development of algebra teachers. The material includes distance-learning technologies to enhance professional development opportunities using the standards-based algebra curriculum developed by the Curriculum Research and Development Group. The material includes videotaped classroom instruction combined with online communication for continued year-long discussion and follow-up support for algebra teachers. The material also provides resources for classroom use.

Parent Flash Cards	Physical science	K, 4-10	Partial	This material is part of a larger project developed at the Museum of Science and Industry in Chicago called the Parent Network. The goal of Parent Flash Cards (or IDEA CARDS) is to help students from inner-city neighborhoods learn scientific and technological themes including water, light, color, force, motion, air, and balance. On each flash card is an activity for parents to do with the student, the supplies needed, an extension activity, and recommended books on the theme.
Practical Math/ Pre-GED (General Educational Development)	Quantitative analysis and reasoning, and communication	High school equivalency program	Partial	The goal of this material is to help students develop problem-solving skills in real-life situations. Designed around the findings and recommendations of the 1991 report of the Secretary of Labor's Commission on Achieving Necessary Skills, the course targets skills that employers want with an emphasis on work place and everyday uses of math.
Project Focus on Achieving Standards in Teaching Mathematics	Basic concepts in mathematics	7-9	Multiple	This material is designed to teach basic concepts in mathematics to students with limited English proficiency.
Supporting Young Children's Readiness for School Mathematics through Pre-Kindergarten Classroom and Family Math Curriculum	Enumeration and number sense, arithmetic reasoning, spatial sense and geometric reasoning, measurement, and computer math	Pre-K, K	Partial	The goal of this material is to enhance young children's readiness to learn mathematics. The material includes eight topical units, each with a range of informal math activities and concrete materials. Teachers are instructed in the classroom-based component of the material through workshops and a functioning model classroom. Parents are taught the home-based component of the material by attending family mathematics classes with their children. After class, it is hoped that parents will take home and use math kits containing sets of hands-on math activities with their children.

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Teams Distance Learning Program	General studies	1-8	Partial	The goal of the material is to deliver, via satellite and the Internet, instructional activities that cover the areas of math, science, reading, language arts, history, social sciences, and technology. The material consists of month-long interactive instructional modules, each containing eight student programs, preceded by a 1-hour professional development program. Each student program includes lesson guides, classroom kits, and an orientation and staff development program.
Transition to Advanced Math	High school standards-based math	9	Partial	The goal of this material is to teach high school standards-based mathematics to students who enter the ninth grade significantly below grade level, with poor prior preparation and weak motivation. The material is designed to provide students with intensive support through monthly workshops and weekly in-class coaching for at least 2 years.
WebQuest Units	General studies	K-12	Multiple	The goal of this material is to provide teachers with templates and instruction in developing, implementing, and assessing curriculum units. The units are designed as inquiry-oriented activities that each typically take 3-6 weeks to complete. The material also provides resources for use by classroom teachers.
World Lab	Science and social studies	K-5	Multiple	This material is a thematic science and social studies program that integrates reading, writing, math, and the fine arts. The goal of Worldlab is to teach students about the world by having them investigate real-world problems and topics, including economic, political, biological, and physical systems. This material incorporates field studies, community resources, computer technology, and telecommunications as means to obtain information about the world. In addition, this material utilizes simulation, group investigation, and

				cooperative learning to accomplish its learning objectives.
Young Astronauts I and II	Astronomy, flight, and rocketry	4-6	Single	These materials are designed to encourage students to develop knowledge, skills, and a positive attitude toward science, technology, and math. The materials use a learn-by-doing approach to integrate facts with scientific processes, and enhance higher-order thinking skills and competence in problem solving. The Young Astronauts I and II course materials may be used separately or together, as they are complementary but independent.
Department of Energy				
Lesson Plans Describing Fossil Energy and Technology	Fossil fuel energy	7-12	Single	This material is designed to describe the formation and uses of fossil fuels. Its goal is a discussion of energy as one of the basic necessities.
Environmental Protection Agency				
National Drinking Water Week Kit	Water quality	K-12	Partial	This material is designed to complement an existing school drinking water curriculum. The material's goal is to raise students' awareness of environmental drinking water issues.
The Water Drop Patch Project: Making a Difference	Watershed protection	1-12	Single	The goal of this material is to educate students in the need to protect water resources. This material consists of 20 different activities and is designed to encourage students to become watershed and wetlands stewards.
Federal Aviation Administration				
Lesson Plans That Fly—Aviation in a Bag	Aviation science	3-6	Partial	This material consists of an aviation science kit and lesson plan designed to teach science with aviation as a motivator. The lesson plans explore the principles of flight including Bernoulli's principle, creating lift, gravity, thrust, control surfaces, and aircraft design.
Take-Off Series Kit	Aviation science, and history	7-8	Partial	This material is designed to allow students to investigate the concepts of aeronautics and aviation science as part of cooperative learning groups. The material contains a five part video series called "Take-Off!" based on live

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				interactive broadcasts of the same name; a Web supplement that provides access to collections of online aviation resources; and a teacher's guide to support teachers who use the series in the classroom.
National Aeronautics and Space Administration				
Astronomy Village	Astronomy	9-12	Partial	The goal of this material is to provide schools with a multimedia curriculum resource. Astronomy Village is a CD-ROM-based multimedia program designed to provide opportunities for students to engage in scientific inquiry, learn about stars and stellar evolution, and make use of NASA resources and data.
Bioblast	Biology	9-11	Partial	This material is designed as a multimedia curriculum supplement for high school biology classes. Its goal is to encourage students to conduct scientific research based on the actual research now being conducted by NASA's Advanced Life Support Research program.
CERES	Astronomy	K-12	Partial	The goal of this material is to teach students about astronomy using online NASA resources, data, and images. In addition to classroom-ready materials, CERES has developed several online NASA data search engines and two graduate-level distance learning courses that are available over the Internet to K-12 teachers. The material is accessed through NASA's Web site.
NASA Connect	Math, science, and technology	4-8	Partial	The goal of this material is to teach students math, science and technology. The material consists of five 30-minute television programs available via public and cable access stations, and an accompanying Web-based component with online projects.
National Institutes of Health				
Estrogen Receptors	Hormones	9-12	Partial	This material was designed as a tutorial for teachers to teach students about the hormone estrogen and its receptors, and to explain the relationship of estrogen and its receptors to breast cancer and the risks and benefits of reducing cancer risk with drugs called

				antiestrogens and selective estrogen receptor molecules. This material is available from the Internet.
Frontiers in Physiology	Physiology	6-12	Partial	The goal of this material is to improve education in the science of physiology in such areas as neural reactions and reflexes and cardiovascular response to exercise. The instructional activities include individual labs/lessons designed to help students explore and learn topics in physiology.
Health Science Curriculum Online	Health science	7-12	Partial	This material was designed to teach students about diabetes, cardiovascular disease, and cancer, using both Internet technology and in-classroom experiments. Resources include a database of public health clinics across the country and scientific vocabulary in both Spanish and English.
Mind Over Matter: The Brain's Response to Drugs	Effect of drug use	5-9	Partial	The goal of this material is to provide students and teachers with science-based information about drugs, improve science education and literacy, and discourage drug use by students. The material is designed to explain to students the effects of marijuana, opiates, inhalants, anabolic steroids, stimulants, nicotine, methamphetamine, and hallucinogens on the brain.
My Health My World	Health and nutrition	2-4	Partial	This material is designed as one in a series of individual health learning units. The instructional activities include an adventure storybook, a language arts supplement, an activities guide for teachers, and a take-home mini-magazine.
Mystery of the Crooked Cell	Biotechnology	7-12	Partial	This material is designed to teach molecular biology using one mobile and two stationary laboratories that accommodate 24 students each. The Mystery of the Crooked Cell is a single module used in conjunction with the biotechnology learning laboratory at Boston University School of Medicine.
Positively Aging	Gerontology and health	6-8	Partial	The goal of this material is to teach middle school students about geriatrics and gerontology while incorporating math and science curricular elements. The material is

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				also designed to show the association of aging with specific diseases, and to teach health promotion and disease prevention to enhance healthy habits. The material consists of 12 thematic interdisciplinary units with 276 separate learning activities.
Understanding Cancer	Cancer	9-12	Partial	This material was designed as a tutorial for teachers to teach students what cancer is, to explain the link between genes and cancer, and to discuss what is known about the causes, detection, and diagnosis of the disease. The material also provides resource support for classroom teachers. This material is available from the Internet.
Understanding Gene Testing	Gene testing	9-12	Partial	This material was designed as a tutorial for teachers to teach students what genes are and how mutations occur and are identified within genes; it discusses the benefits and limitations of gene testing for cancer and other disorders. The material also provides resource support for classroom teachers. This material is available from the Internet.
National Oceanic and Atmospheric Administration				
A Resource Guide for Oceanography and Coastal Processes Developed for Elementary, Middle and High School Teachers	Marine science	K-12	Multiple	This material is designed to teach oceanographic and coastal process science through a range of activities including a 14-day in-residence teacher-training program; teachers-to-sea experiences aboard Navy survey vessels; and an Internet site that contains data visualization tools, interactive curricular materials, communication resources, and related materials to support and provide classroom-based follow-up activities for education and training programs.
Beach Explorations: Pacific Information Cards	Marine ecology and conservation	5-9	Partial	This material is designed to teach students about basic marine ecology concepts such as habitat, tidal cycle, predator and prey, microscopic plankton, life cycles, food relationships, adaptations, and conservation.
Biofilms and Biodiversity	Marine biology	6-12, Under-graduate, and graduate	Partial	This material is designed to teach middle school, high school, college, and graduate students aspects of aquatic microbial ecology and biotechnology research. The primary focus is on the

		levels		study of bacterial biofilms and the aquatic organisms that colonize them. Students are given access to an interactive Web site. Visiting school groups use research laboratories that are designated for student use and staffed with experienced educators at the University of Maryland Biotechnology Institute's Center of Marine Biotechnology.
Estuary Live	Estuarine ecology	K-12 and Under-graduate level	Partial	This material is a series of live, interactive Internet field trips and support materials designed to explore the general ecology of different estuarine areas. A general video, activities, field guides, and project building materials such as film clips, graphics, and press releases are available online as well.
Estuary Net	Water quality	9-12	Single or multiple	The goal of this material is to assist classroom teachers, students, and citizen volunteer water quality monitors in understanding regional water quality issues. The curriculum is available online and is designed to encourage communication between schools and the National Estuarine Research Reserves about water quality.
From Whaling to Watching	Marine life studies	6-8	Partial	The goal of this material is to teach middle school students about the Northern Right Whale, its natural history, and conservation efforts. Materials include a teacher's manual, a video, and a two-part poster on the anatomy of the Northern Right Whale.
GLOBE Teacher's Guide, Video and Web Materials	Earth's environment	K-12	Partial	The goal of this material is to teach students about the earth's environment using 20 scientific data-sharing protocols in the areas of atmosphere, hydrology, land cover biology, soil, and Global Positioning Systems.
Gulf of Farallones National Marine Sanctuary	Habitats, species groups, and issues surrounding the Gulf of Farallones National	K-12	Multiple	The goal of this material is to teach students about habitats and species groups by studying the issues that surround the Gulf of Farallones National Marine Sanctuary.

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	Marine Sanctuary			
Island Explorers Program	Marine science	4-7	Single	This material is designed as a science curriculum that contains hands-on, real-life marine science activities. It focuses on Southern California and Catalina Island where students participate in field trips to local beaches and aquaria, and on a research vessel marine laboratory.
Long-term Ecosystem Observatory Internet Curriculum	Marine science	5-12	Multiple	This material is a series of five Internet-based activities that focus on real-time research currently being conducted at the Jacques Cousteau National Estuarine Research Reserves in New Jersey. The activities focus on physical and biological data associated with the Gulf Stream current.
MARE (Marine Activities, Resources and Education) East Coast Supplementary Modules	Marine science	K-12	Partial	The goal of this material is to incorporate current marine science research into the classroom. The material is designed to provide precollege educators in New Jersey access to the Institute of Marine and Coastal Sciences at Rutgers University through such means as workshops for educators, seminars on current research topics, Internet-based applications, outreach activities, and resources for use by classroom teachers.
Oceans, Coastal Hazards: Hurricanes, Tsunamis, Coastal Erosion	Coastal hazards	K-12	Multiple	The goal of this material is to assist states and educate citizens to employ the most effective means to reduce loss of life due to coastal hazards and to mitigate the economic impacts of these hazards. The material also provides resources for use by classroom teachers.
The St. Jones Delaware National Estuarine Research Reserve Curriculum	Estuary conservation	5-12	Partial	The goal of this material is to make students aware of environmental management issues related to the St. Jones estuary and watershed. The material is designed to be correlated with the science, math, social studies, and language arts standards and performance indicators for grades 5-12. In addition, information is given where applicable about whether the program

				contains opportunities to use visual, creative, or technological arts.
United States Geological Survey				
Africa GIS-Based Project	Geography	9-12	Partial	The goal of this project is to teach high school students African geography through the exploration of Africa's physical environment. The project includes a Geographic Information Systems component.
County School Patterns	Geography and sociology	9-12	Partial	The goal of this material is to teach high school students geography and sociology by examining demographic and educational statistics within a county.
Earthquakes Everyday	Seismology	3-12 and Under-graduate level	Partial	The goal of this material is to explore earthquake activity and its patterns globally through the use of past and current earthquake epicenter data. The material includes Geographic Information Systems software.
Echo the Bat or Imagers	Light and sound	5-8	Partial	The goal of the project is to introduce students to the topics of remote sensing and biodiversity. Student instructional activities include a Web-based site featuring an interactive adventure and a teacher's guide.
GLOBE: Satellite Imagery Packets	Earth's environment	K-12	Multiple	The goal of this material is to teach students about geography and global environmental issues through the use of satellite data from the U.S. Geological Survey EROS Data Center.
Water Matters, Vol. 3	Water resource education	2-8	Multiple	This material is one part of a larger material set entitled the Water Resource Education Initiative. This material is designed to act as a curriculum guide for teachers on the topics of oceans, watersheds, and hazardous waste.
74,796 Ready-to-Go Map Mysteries	Topography	4-12 and Under-graduate level	Partial	The goal of this material is to teach students about the world's physical and cultural environment through the use of topographic and thematic maps.

[a] Materials are designed for partial, single, or multiple academic years. Teachers may use the materials for shorter or longer periods of instruction.

[b] The design of these materials allows them to be used for single instructional periods for up to at least half of the academic school year.

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Source: GAO review of the material descriptions provided by each agency and a search of Internet sites that disseminate information about math and science materials for kindergarten through 12th grade.

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